What is claimed is:

1. An optical imprinting apparatus comprising:

a container in which light is enclosed therein;

an exposure-mask having a proximity field exposure pattern firmly fixed to a section of said container for exposing said exposure pattern on a photo-sensitive material through an evanescent field by said light enclosed therein; and

a light source for supplying said light in said container.

2. An optical imprinting apparatus according to claim 1, wherein said container comprises a waveguide, and a light source is disposed outside of said waveguide for injecting a light into said waveguide.

3. An optical imprinting apparatus according to claim 1, wherein said light source is disposed inside of said container.

4. An optical imprinting apparatus according to claim 1, wherein said exposure-mask is provided integrally with said container having light source therein.

5. An optical imprinting apparatus according to claim 1, wherein said exposure-mask is detachably attached to said container.

6. A method for evanescent-field-assisted imprinting, comprising:

placing a proximity field exposure pattern on a section of container in which light is enclosed;

aligning a fabrication object having a photo-sensitive film thereon in proximity of said proximity field exposure pattern; and

injecting a light from said container into said proximity field exposure pattern so as to imprint said proximity field exposure pattern on said photo-sensitive material by means of an evanescent field formed between said proximity field exposure pattern and said photo-sensitive film.

7. An exposure-mask for imprinting micro-patterns on a mask base in cooperation with an evanescent field generated by exposure light from a light source, comprising:

mask base being transmissive to said exposure light;

micro-patterns being comprised by high structures and low structures of sub-wavelength dimensions with respect to a wavelength of said exposure light, and

said low structures being embedded with a material of low transmissivity to said exposure light.

8. A method for making an exposure-mask, comprising:

forming a metal thin film layer on a mask base made of a material transmissive to exposure light;

coating a photo-sensitive material on said metal thin film layer;

fabricating micro-patterns on said photo-sensitive material using electron beams or X-ray beams; and

irradiating with a fast atomic beam using said micro-patterns fabricated on said photo-sensitive film as exposure-mask, thereby forming micro-patterns of said metal thin film on said mask base.

9. A method for making an exposure-mask, according to claim 8, wherein said micro-patterns have sub-wavelength dimensions with respect to a wavelength of an exposure light.

10. A method for imprinting micro-patterns on a substrate base, comprising:

coating not less than two coating layers, including an upper layer of a photo-sensitive film having a thickness dimension of less than a wavelength of exposure light;

placing an exposure-mask having proximity patterns in contact with or in proximity of said photo-sensitive film at a sub-wavelength distance so as to generate an evanescent field and expose said proximity patterns on said photo-sensitive film;

developing exposed proximity patterns by photo-processing to produce a first etch-mask;

fabricating a lower coating layer on said substrate base using said first etch-mask to produce a second etch-mask comprised by said lower layer; and

fabricating proximity field exposure patterns on said substrate base using said second etch-mask.

11. A method according to claim 10, wherein a thickness of said first coating layer is essentially the same as a minimum dimension of said proximity field exposure pattern.

12. A method according to claim 10, wherein fabrication of said substrate base or said lower layer is performed using a fast atomic beam.

13. A method for imprinting micro-patterns on a substrate base comprising:

applying a first coating of a photo-sensitive material on said substrate base to a thickness less than a wavelength of an exposure light;

placing an exposure-mask having a proximity field exposure pattern in contact with or in proximity of said proximity field exposure pattern at a sub-wavelength distance;

exposing said coating through said exposure-mask using said exposure light through an evanescent field and developing by photo-processing to produce first imprinted patterns on said first coating;

forming a second coating on said first imprinted pattern of said photo-sensitive material;

dissolving said first coating to liftoff said first imprinted patterns, thereby leaving second imprinted patterns formed by said second coating; and

fabricating said substrate base using said second imprinted patterns as etch-mask to produce micro-patterns on said substrate base.

14. A method according to claim 13, wherein a thickness of said first coating is essentially the same as a minimum dimension of said proximity field exposure pattern.

15. A method according to claim 13, wherein fabrication of said substrate base or said first coating is performed using a fast atomic beam.

16. An exposure-mask for evanescent-field-assisted imprinting, comprising:

a transmissive material; and

a proximity field exposure pattern of sub-wavelength dimensions fabricated thereon, said proximity field exposure pattern being produced by imprinting a master proximity field exposure pattern provided on a mother mold.

17. An exposure-mask according to claim 16, wherein said mother mold is a metal mold.

18. A method for making an exposure-mask by preparing a mother mold having a proximity field exposure pattern of sub-wavelength dimensions, comprising:

pouring a transmissive material in a molten state into said mother mold; and

cooling and detaching a solidified pattern from said mother mold, thereby producing an imprinted proximity field exposure pattern.

19. A method according to claim 18, wherein detaching from said mother mold is based on differential thermal expansion effects of materials constituting said mother mold and an imprinted pattern.

20. A method according to claim 18, wherein the mother mold is pre-coated with a soluble film, which is dissolved when detaching a solidified pattern from the mother mold.

21. A method for imprinting micro-patterns on an imprint base by preparing a pattern template having a fine structure, comprising:

coating a semi-solid material on an imprint base;

pressing said pattern template on said semi-solid material to produce a duplicated pattern of said fine structure; and

irradiating an energy beam on said duplicated pattern of said semi-solid material to produce said micro-patterns on said imprint base.

22. A method according to claim 21, wherein said fine structure comprises of high and low structures of sub-wavelength dimensions.

23. A method according to claim 21, wherein said pattern template is a roller having said fine-structure fabricated on an roller surface, and said fine-structure is duplicated on an imprint base by press rolling on said semi-solid material.

24. A method according to claim 21, wherein said pattern template is a flexible material disposed away from said semi-solid material on imprint base, and said template is pressed by a roller to contact said semi-solid material, thereby imprinting said micro-patterns on said semi-solid material.

25. A method for imprinting micro-patterns on an imprint base by preparing a pattern template, comprising:

pouring a molten material on said pattern template;

cooling said molten material on said pattern template; and

detaching a solidified molten material having a duplicated pattern of said fine structure.

26. A method according to claim 25, wherein said fine structure comprises of high and low structures of sub-wavelength dimensions.

27. A method for fabricating micro-patterns on an imprint base, comprising:

coating a photo-resist film on an imprint base;

forming a fine structure on said photo-resist film by means of electron beams or X-ray beams and developing by photo-processing to fabricate etch-mask; and

irradiating with a fast atomic beam through said etch-mask to produce an imprint base having said micro patterns duplicated thereon.

28. A method according to claim 27, wherein said micro patterns have sub-wavelength dimensions.

29. A method for imprinting fine patterns on an imprint base for LSI devices, comprising:

preparing an exposure-mask having a fine structure of sub-wavelength dimensions; and

exposing a substrate base of a semiconductor material coated with a photo-sensitive material through said exposure-mask in an evanescent field so as to imprint fine patterns on said substrate base of said LSI devices.

30. A method for imprinting micro-patterns on LSI devices, comprising:

preparing a pattern template having a fine structure;

pressing said pattern template on a semi-solid material coated on a substrate base of a semiconductor material so as to imprint said fine structure on a surface of said semi-solid material; and

etching said surface of said semiconductor material using imprinted patterns as etch-mask to fabricate said LSI devices on said semiconductor material.

31. An optical data recording medium, comprising:

a recording disk having a surface for containing recorded signals; and

recording pits disposed on said recording disk, said recording pits being fabricated using a method of evanescent-field-assisted fabrication.

32. An optical data recording apparatus, comprising:

a recording medium having micro-patterns of sub-wavelength dimensions with respect to signal light, having different transmissive and reflective properties;

a light source for signal light; and

a detection section disposed opposite to a patterned surface of said recording medium.

33. A magnetic-optical recording head, comprising:

an optical fiber having a sharpened tip of a sub-wavelength dimension with respect to signal light, and

a magnetic field generation coil for magnetizing a magnetic layer disposed in proximity of said sharpened tip in association with said magnetic-optical recording head.